

REDESCRIPTION OF TERPIDES DEMOULIN FROM ST. VINCENT,
WEST INDIES (EPHEMEROPTERA: LEPTOPHLEBIIDAE)

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ABSTRACT—*Terpides jessiae*, a new species of the Leptophlebiidae from St. Vincent, West Indies, is described from reared nymphs and adults. Nymphs of *Terpides* Demoulin are redescribed and the adults are described for the first time. Relationships of *Terpides* to other genera are discussed. This is the first record of a leptophlebiid genus known from continental South America and an island of the West Indies.

Demoulin (1966) established *Terpides* for *T. guyanensis* which he described from 11 nymphs collected in the Surinam River Drainage. Recently one of us (A.D.H.) collected and reared a new species of *Terpides* in St. Vincent, West Indies.

The following terms and procedures used in the generic descriptions of the imagos and nymphs require further explanation. Venational terminology used is as given by Peters (1971). Each segment of the fore legs of the male imagos is compared to the length of the fore tibiae and expressed as a ratio, while the average length in millimeters of the fore tibiae is given in parentheses. In the figure of the labium, the ventral surface is shown on the right hand side of the drawing, and the dorsal surface is shown on the left.

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Terpides Demoulin, 1966

Fig. 1-20

Terpides Demoulin, 1966:15.

Imago. Length of ♂: body, 4.8-5.6 mm; fore wings, 5.2-5.9 mm. Length of ♀ subimago: body, 5.3 mm; fore wings, 6.5 mm. Eyes of ♂ meet on meson of head, lower portion of eyes $\frac{3}{4}$ length of upper portion, eyes of ♀ subimago separated on meson of head by a length 4 times as great as maximum width of an eye. Wings (fig. 1-3): vein R_s of fore wings forked $\frac{1}{3}$ of distance from base to margin; vein MA forked a little more than $\frac{1}{2}$ of distance from base to margin, fork asym-

metrical, distal portion of vein *MA* sagged posteriorly; vein *MP*₂ attached at base to vein *MP*₁ with a cross vein $\frac{1}{2}$ of distance from base to margin; cubital area as in fig. 1; cross veins few. Costal projection of hind wings well developed, rounded (fig. 2-3), apex located $\frac{1}{2}$ distance from base; apex of wings acute, rounded (fig. 2-3); cross veins few. Legs: ratios of segments in δ fore legs, 0.60: 1.00 (2.5 mm): 0.04: 0.40: 0.30: 0.20: 0.10. Claws of a pair alike, each apically hooked (fig. 4). δ genitalia (fig. 5): segment 3 of forceps $\frac{1}{2}$ length of segment 2, segment 2 of forceps $\frac{1}{8}$ length of segment 1, base of forceps bulbous, apical $\frac{1}{3}$ of segment 1 a little broader than middle, forceps bowed inwardly as in fig. 5; length of styliger plate along median line less than $\frac{1}{3}$ maximum width, posterolateral projections extend dorsally over forceps base; basal $\frac{2}{3}$ of penes fused, apical $\frac{1}{3}$ of penes divided and tubular, apex of penis lobes acute, rounded, penes progressively broader basally. Ninth sternum of δ subimago deeply cleft apically (fig. 9). Terminal filament longer than cerci.

Mature nymph: Head prognathous. Antennae 2 times maximum length of head. Mouthparts (fig. 10-16): dorsal hairs on labrum as in fig. 13; submedian areas of hair ventrally, 6 small, subequal sized denticles on anteromedian emargination (fig. 14). Clypeus as in fig. 13. Left mandible as in fig. 10. Lingua of hypopharynx rectangular (fig. 15); superlingua of hypopharynx as in fig. 15, with row of hairs along anterior margin. Segment 2 of maxillary palpi subequal in length to segment 1; segment 3 of palpi $\frac{2}{3}$ to $\frac{3}{4}$ length of segment 2, triangular; V-shaped ridge near ventral, inner anterolateral margin of maxillae; hair on maxillae as in fig. 11-12. Labium as in fig. 16; segment 2 of palpi $\frac{3}{4}$ length of segment 1; segment 3 of palpi more than $\frac{3}{4}$ length of segment 2, triangular; paraglossae ventral to glossae, glossae curved over ventrally (fig. 16). No visible hairs or setae on body. Legs (fig. 17-18): apex of claws hooked and narrow, a large denticle in middle of inner margin, basal to large denticle several denticles, denticles progressively larger apically, apical to large denticle several small, equal sized denticles. Gills (fig. 19): gills on segments 1-7 alike; dorsal and ventral portions of lamellae slender, each portion tapered smoothly at apex; main trunk of tracheae along median line of lamellae, tracheae on both sides of main trunk branched, tracheae pigmented. Posterolateral spines on abdominal segments 3 or 5 to 6 and 8-9, spines absent on segment 7, spines progressively larger posteriorly. Terminal filament longer than cerci; long hairs on basal $\frac{1}{2}$ of inner margin of cerci and lateral margins of terminal filament.

Type-species: *Terpides guyanensis* Demoulin, by original designation.

Terpides jessiae Peters and Harrison, new species

Fig. 1-20

Male imago (in alcohol): Length: body, 4.8-5.6 mm; fore wings, 5.2-5.9 mm. Upper portion of eyes brown, lower portion black. Head brown, anterior margin and carinae blackish brown. Scape and pedicle of antennae dark brown, flagellum paler. Basal $\frac{1}{2}$ of ocelli blackish brown, apical $\frac{1}{2}$ white. Notum and sternum of thorax brown, sutures paler, carinae dark brown; pleurae lighter brown, sutures paler, carinae darker, areas posterior to prothoracic coxae and around mesothoracic coxae washed in light blackish brown. Coxae and trochanters of prothoracic,

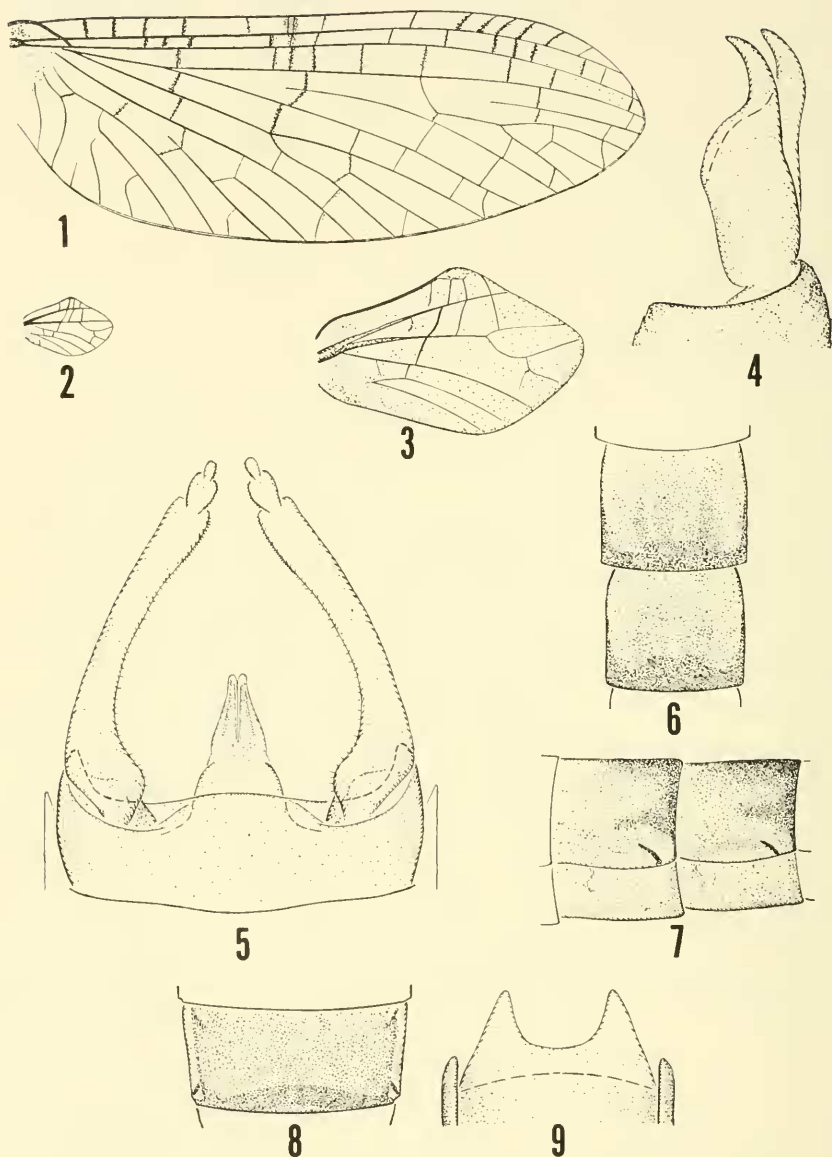


Fig. 1-7, *Terpides jessiae*, ♂ imago: 1, fore wing. 2, hind wing. 3, hind wing enlarged. 4, fore claws. 5, genitalia, ventral view. 6, abdominal segments 5-6, dorsal view. 7, abdominal segments 5-6, lateral view.

Fig. 8-9, *T. jessiae*, ♀ subimago: 8, abdominal segment 6, dorsal view. 9, ninth sternum, ventral view.

mesothoracic, and metathoracic legs and femora of prothoracic legs dark brown, except a small paler area in middle of femora, apex of prothoracic femora and base of prothoracic tibiae dark blackish brown, middle and apex of mesothoracic and metathoracic femora with a darker brown macula, that on apex darker, remainder of legs pale. Wings (fig. 1-3): longitudinal and cross veins of fore and hind wings light brown; membrane of fore and hind wings transparent, hyaline, except some cross veins in anterior $\frac{1}{2}$ of fore wings surrounded with small dark brown clouds as in fig. 1, clouds between cross veins in cells C, S_c, and R fuse near bulla. Abdomen: segments 1-7 hyaline, washed with light brown, segments 8 and 9 opaque, washed with light brown; terga 1-8 with a wide, transverse, dark brown band on posterior margin, band widest near meson of each tergum (fig. 6), band faded on terga 7 and 8, terga 1-8 with posterolateral, brown maculae that fuse to posterior band, maculae faded on terga 7 and 8, terga 2-8 with a faint whitish pattern on meson, spiracles blackish brown, tracheae washed lightly with brown (fig. 6-7); sterna 1-8 with narrow, transverse, darker brown band on posterior margins, bands progressively faded posteriorly. Genitalia (fig. 5): light brown, apical $\frac{1}{2}$ of forceps paler. Caudal filaments pale, wide brown annulations at articulations.

Female imago: Unknown.

Female subimago (in alcohol): Length: body, 5.3 mm; fore wings, 6.5 mm. Eyes black. Head whitish brown, dark on meson and between ocelli. Scape and pedicel brown, flagellum paler. Basal $\frac{1}{2}$ of ocelli blackish brown, apical $\frac{1}{2}$ white. Color and markings of thorax as in δ imago, except pleurae paler. Color and markings of legs as in δ imago, except median area of prothoracic femora whiter and more distinct. Wings: color and markings of fore and hind wings as in δ imago, except membrane translucent, light brown. Abdomen: color and markings as in δ imago, except mesal pattern on terga 2-8 obscured (fig. 8), and sterna 1-9 uniformly light brown. Caudal filaments pale.

Mature nymph (in alcohol): Head brown, venter paler. Color and markings on thorax as in δ imago, except venter paler. Color and markings on legs as in δ imago, except maculae at apex of mesothoracic and metathoracic femora absent, and middle brown macula of femora darker. Abdomen: light brown, venter lighter, terga 2-9 with darker brown markings as in fig. 20, markings faded on terga 7-9. Gills hyaline, tracheae black. Caudal filaments light brown, darker annulations at articulations.

Specimens: All specimens collected from St. Vincent, West Indies. Holotype δ imago reared with nymphal exuvia, tributary of Chateaubelair Riv., 100 m, 13° 17' N, 61° 14' W, 18-X-71. Allotype η subimago reared with nymphal exuvia, tributary of Colonarie Riv., Locust Valley, 490 m, 13° 15' N, 61° 10' W, 24-VI-71. Paratypes: 1 δ imago reared with nymphal exuvia, 1 nymph, 2 nymphal exuviae, tributary of Rabacca Riv., 460 m, 13° 19' N, 61° 10' W, 1-XII-71; 1 nymph, Petit Bordel Riv., Newfoundland, Linley Valley, 530 m, 13° 16' N, 61° 12' W, 15-VII-71; 1 nymph, Rabacca Riv., 8 m, 13° 18' N, 61° 04' W, 1-III-71; 2 nymphs, tributary of Yambou Riv. at Majorca, 370 m, 13° 12' N, 61° 12' W, 10-VIII-72. All types were collected by A. D. Harrison and all are in alcohol. Association of the nymphs with the δ imagos and η subimago is by rearing.

Holotype with nymphal exuvia, allotype with nymphal exuvia, 2 nymphal paratypes, and 1 nymphal exuvia paratype are deposited in the collections of Florida

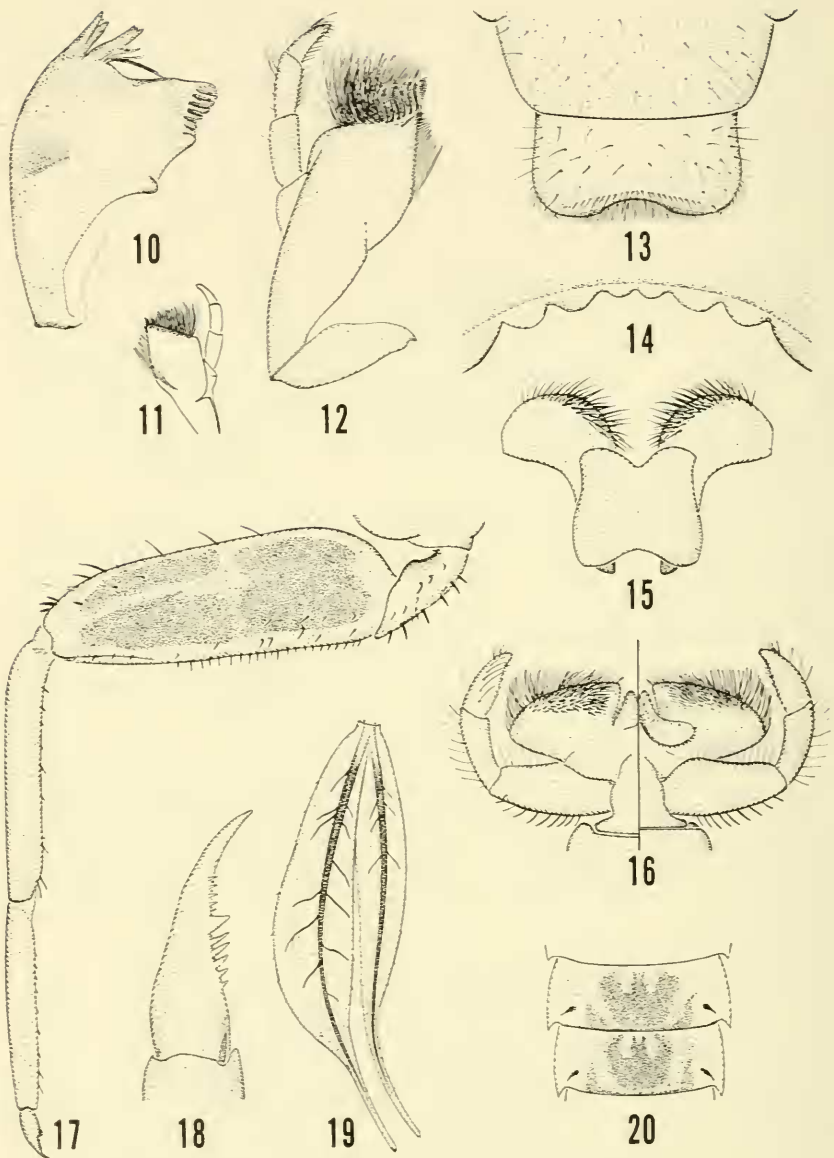


Fig. 10-20, *T. jessiae*, mature nymph: 10, left mandible, dorsal view. 11, right maxilla, dorsal surface. 12, right maxilla, ventral view. 13, labrum and clypeus. 14, anteromedian emargination of labrum enlarged. 15, hypopharynx. 16, labium. 17, fore leg. 18, fore claw. 19, abdominal gill 4. 20, abdominal segments 5-6, dorsal view.

A & M University. One ♂ imaginal paratype with nymphal exuvia, 2 nymphal paratypes, and 1 nymphal exuvia paratype are deposited in the collection of the University of Utah. One nymphal paratype is deposited in the collection of the U. S. National Museum of Natural History.

The mesal abdominal color pattern is variable between the two ♂ nymphs. The pattern on one is obscure as in the two ♂ imagos, while the pattern is more distinct on the other ♂ nymph. The extent of the dark colored maculae on the femora varies in the nymphs. Figures 6 and 7 of the ♂ abdominal color pattern of segments 5-6 are drawn from the paratype. In the holotype, the pattern is similar but lighter; on the terga, the pale dorsal submedian maculae are larger, the light lateral color extends over a greater area, and the dorsal and lateral markings cover a smaller area.

Nymphs of *T. jessiae* can be distinguished from those of *T. guyanensis* nymphs by the following characters: (1) posterolateral spines occur on segments 3-6 and 8-9; (2) the apex of the prothoracic tibiae is unicolorous; (3) the mesothoracic and metathoracic femora possess a small, median, darker brown macula; and (4) terga 2-9 possess a darker brown, mesal color pattern, as in fig. 20.

In the figure of *T. guyanensis* of Demoulin (1966), there appear to be only three denticles on the anteromedian emargination of the labrum; however, Demoulin (personal communication) has verified that six denticles are present.

Biology: Most nymphs were found in torrential, stony streams; early instars inhabited the underside of stones in fast-flowing water, but nymphs of early and late instars were also found in regions of quieter flow. One specimen, about to molt, was collected between the stems and roots of dasheens, *Colocasia esculentum* (L.) Schott, growing along the edge of a small tributary of the Chateaubelair River. Distribution on St. Vincent was remarkably patchy; nevertheless, there was a distinct tendency for denser populations to occur in forest streams rich in leaf litter. In some cases a single nymph with dark wing pads was found in a sheltered spot, although thorough search of the adjacent stream bed revealed no further specimens.

Nymphs were remarkably hardy and were easily brought back alive to the field station in a small quantity of water in a plastic bag; they were reared in an aquarium among stones and stream debris with gentle bubbling. Subimagos emerged in the late afternoon and the subimaginal molt occurred before the next morning.

Etymology: This species is named in honor of Dr. Jessie J. Rankin, wife of Dr. A. D. Harrison.

Discussion: *Terpides* appears to be most closely related to the other Leptophlebiidae from the West Indies and certain genera (*Simothraulopsis*, *Hagenulopsis*, and *Askola*) occurring in northern South America.

However, *Terpides* can be distinguished from these genera by the following combination of characters. In the imagos, (1) claws of a pair are alike; each is apically hooked (fig. 4); (2) basal $\frac{2}{3}$ of penes of δ genitalia are fused (fig. 5); (3) hind wings are present and well developed (fig. 2-3); and (4) costal projection of the hind wings is well developed and rounded (fig. 2-3). In the nymphs, (1) lingua of the hypopharynx is rectangular (fig. 15); (2) posterolateral spines occur on abdominal segments 3 or 5 to 6 and 8-9; spines are absent on segment 7; (3) a large denticle occurs in middle of inner margin of claws; basal to large denticle are several denticles, progressively larger apically; apical to large denticle are several small, equal sized denticles (fig. 18); (4) long hairs occur on basal $\frac{1}{2}$ of the inner margin of cerci and lateral margins of terminal filaments; and (5) dorsal and ventral portions of abdominal gills 1-7 are slender and each portion is tapered smoothly at apex (fig. 19).

Terpides can be distinguished from all other genera of the Leptophlebiidae by the following combination of characters. In the imagos, (1) fork of vein MA of the fore wings is asymmetrical (fig. 1); (2) the hind wings are present and well developed (fig. 2-3); (3) claws of a pair are alike; each is apically hooked (fig. 4); (4) basal $\frac{2}{3}$ of penes of δ genitalia are fused (fig. 5); and (5) lateral projections of styliger plate of δ genitalia extend dorsally over forceps base (fig. 5). In the nymphs, (1) lingua of hypopharynx is rectangular (fig. 15); (2) long hairs occur on basal $\frac{1}{2}$ of the inner margin of cerci and lateral margins of terminal filament; (3) a large denticle occurs in middle of inner margin of claws; basally and apically to large denticle, several smaller denticles occur (fig. 18); (4) posterolateral spines occur on abdominal segments 3 or 5 to 6 and 8-9 only; and (5) dorsal and ventral portions of abdominal gills 1-7 are slender and each portion is tapered smoothly at apex (fig. 19).

In the keys to the West Indian genera of Leptophlebiidae given by Peters (1971), imagos of *Terpides* key to the first half of couplet 3, *Neohagenulus*. However, *Terpides* can be distinguished from *Neohagenulus* by the similar tarsal claws (fig. 4) and the rounded costal projection of the hind wings (fig. 2-3). Nymphs of *Terpides* key to couplet 3, *Neohagenulus*, and 4. However, *Terpides* can be distinguished from all other genera in couplet 3 by the absence of posterolateral spines on abdominal segment 7.

Terpides is now known to occur in Surinam and St. Vincent, and this is the first record of a leptophlebiid genus known from both continental South America and the West Indies. Peters (1971) pointed out that study of large collections of Leptophlebiidae from Central and South America did not reveal any genus common to the West Indies and continental areas. However, all other genera of Ephem-

eroptera occurring in the West Indies have representative species in continental South America. While the leptophlebiid genus *Farrodes* Peters occurs in Grenada south of St. Vincent and *Borinquena* (*Australphlebia*) Peters occurs in St. Lucia north of St. Vincent, neither genus appears to occur in St. Vincent. Based on extensive collections by one of us (A. D. H.) only one species of Leptophlebiidae, *T. jessiae*, *Caenis* Stephens, *Tricorythodes* Ulmer, *Leptophyphes* Eaton, and Baetidae occur in St. Vincent.

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